



BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Diploma in Building Services Engineering Pearson BTEC International Level 3 Extended Diploma in Building Services Engineering
Unit number and title	Unit 21: Building Services Science
Learning aim(s) (For NQF only)	Learning aim C: Examine the thermodynamic properties for heating, air conditioning and refrigeration
Assignment title	Thermodynamics in Heating, Air Conditioning and Refrigeration
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are working as a trainee engineer in a company which specialises in design and installation of building services. The senior management is reviewing the induction and training programme for the new employees and are making number of changes to improve it. One such change is to produce reference documents which contains all the required scientific details including sample calculations. You have already produced two documents which were very well received by the management as well as by the trainees. Hence, the management considers that you are the appropriate person to undertake the production of next set of documents relating to Thermodynamic properties.
Task	Produce a document called <i>Thermodynamic Properties</i> using a suitable format as suggested by your line manager. The document will contain illustrations, sketches, line diagrams and model solutions to thermodynamic and psychrometric problems. Within this well referenced document, include the following: Section A: Underpinning principles • Relationship between pressure, temperature, volume and mass • Gas laws, gas equations and Dalton's law along with sample calculations • Relationship between pressure, saturation temperature and enthalpy • Sensible and latent heat • Psychrometric terms and properties of air and water vapour Section B: Applications Produce illustrated posters with annotations to support



	• Five zones of a Pressure-Enthalpy (P-H) diagram. Annotate each zone with clear interpretations. • Application of P-H diagrams in solving thermodynamic problems • Four thermodynamic processes • Psychrometric chart and its application in solving problems. Section C: Example solutions This section will specifically help engineers in your company as this will act a model answer. It is, therefore, necessary that you use correct units and show how you worked out a value. For example, how you have used P-H diagram to determine saturation temperature for a given value of pressure. Use illustrations, sketches and line diagrams to support your answers. You will use the solutions to discuss how these could be used to determine plant duties. Produce solutions to thermodynamic and psychrometric problems which would: • Have multiple pressures • Require interpretation of tables, P-H diagram and psychrometric charts • Involve determination of Relative Humidity and temperature • Involve plotting of summer and winter psychrometric cycles
Checklist of evidence required	A well referenced word-processed document, using a suitable referencing style such as Harvard. Diagrams/sketches/illustrations to support solutions and discussions. Use of credible and range of resources.
Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria, you must show that you are able to:
C.P4	Produce a solution to a thermodynamic problem where there are multiple pressures, with reference to enthalpy.
C.P5	Produce a solution to a thermodynamic problem involving identification, interpretation and plotting of P-H diagrams and processes.
C.P6	Interpret a given psychrometric chart involving properties of air and water vapour mixtures and air conditioning systems in order to determine relative humidity and temperature.
C.M3	Produce clear and accurate solutions to thermodynamic problems with



	reference to enthalpy and P-H diagrams and processes.
C.M4	Produce clear and accurate solutions to psychrometric problems involving properties of air and water vapour mixtures and air conditioning systems in order to determine relative humidity and temperature.
C.D3	Evaluate produced solutions to thermodynamic and psychrometric problems to heating, air conditioning and refrigeration.

Sources of information to support you with this Assignment	Burberry, P, <i>Environment and Services (Mitchells Building Series)</i>, (8th edition), Routledge, 2015, ISBN 9781138167780. This book explains principles of services installations and environmental considerations and is relevant to the content of this unit. Greeno, R, <i>Building Services Handbook</i> (8th edition), Routledge, 2015, ISBN 9781138805637. As the name suggests, a handbook covering all aspects of building services in a concise manner. Floyd T. <i>Electric Circuit Fundamentals</i>, 8th Edition, Pearson, 2009 ISBN 9780135072936 This book provides practical coverage of electrical circuits supported with number of illustrations. McMullan R. <i>Environmental Science in Building</i>, 7th Edition Palgrave Macmillan, 2012 ISBN 9780230290808 The most recognised book which is considered a credible text regarding building science. Journals <i>Building Services Engineering Research & Technology (BSERT)</i>, Sage Publishing This is CIBSE's quarterly journal containing useful research relevant to all aspects of building services engineering. http://journals.sagepub.com/home/bse <i>P & HE Journal</i>, Chartered Institute of Plumbing and Heating Engineers (CIPHE) This is CIPHE online journal which covers a broad range of areas relating to plumbing and heating. http://www.ciphe.org.uk/professional-members/publications/ Websites http://www.cibse.org/ This is the website of Chartered Institute of Building Services Engineers (CIBSE) which is the professional body for building service engineers. The website contains information about the codes, products and industry updates. http://www.modbs.co.uk/ This is the website of Modern Building Services (MBS) covering a wide range of building services engineering sectors.
Other assessment materials attached to	N/A



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